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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,766	11/25/2003	Marco Viti	856063.749	4188

38106 7590 10/25/2005

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EXAMINER	
HORN, ROBERT WAYNE	

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 10/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/721,766	VITI, MARCO	
	Examiner	Art Unit	
	Robert W. Horn	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 15-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-12* is/are allowed.

6)☒ Claim(s) *13,22 and 23* is/are rejected.

7)☒ Claim(s) *15-21 and 24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

The examiner acknowledges the receipt of an amendment to claim 13, which involves adding the limitations of claim 14. The amendment is accepted and entered into the record.

Response to Arguments

Applicant's arguments filed September 15, 2005 have been fully considered.

The argument regarding claims 13, 22 and 23 are not persuasive.

Regarding the amended claim 13, it is noted that the examiner, in the action dated June 15, 2005, found both claim 13 and 14 to be anticipated by Young, (U.S. Patent 5,506,487). The amended claim 13 now has the limitations of original claim 14, rejected in the noted action.

The applicant argues that Young does not disclose the limitation of "repeating the determining and incrementing steps *at a selected frequency* during *a selected time period*." The applicant recites an instance where this limitation may not be faithfully observed.

The examiner response is as follows: Young discloses 8 different embodiments of his invention in the subtitle SUMMARY OF THE INVENTION (columns 2-6). The examiner points to the method described in column 4, lines 40-65 and alternately claim 22. The applicant's amended claim 13 is so broad as to read on the embodiments of the invention taught by Young. Young discloses that various changes could be made in the constructions and methods without departing from the scope of the invention, ..."it is intended that all matter contained in the above description or shown in the

accompanying drawings is illustrative and not in a limiting sense (column 22, lines 9-13). The examiner argues that the example recited by the counter stops a zero is not incremented for a period of time is not a limitation of all embodiments disclosed by Young, and further this example is illustrative and not limiting. Regarding the *selected time period,* this limitation so broad as to read on any selected time period, including the selected time period disclosed by Young. The examiner's task in examining claims is to view the claims by the broadest reasonable interpretation, in light of prior art, without reading the limitations of the specification into the claim. Based on the examiner's interpretation of the claim language of the amended claim 13, these limitations are anticipated by Young.

Regarding claim 22, the applicant references the arguments applied to the amended claim 13. It is noted that claim 22 is not dependent on claim 13 and does not include the limitation "repeating the determining and incrementing steps *at a selected frequency* during a *selected time period.*" The examiner is not limited to applying the same embodiment of the Young reference to claim 22 as applied to claim 13. Claim 22 recites "an enable module configured to enable the counter module during a selected time period." This limitation is so broad as to read on any selected time period, including the selected time period recited by Young.

Regarding claim 23, the applicant suggests that Young does not teach a position detector but a commutation counter and further that since the counter counts to a "preset" value there is no information to be extracted. The examiner replies that commutation relies on the energizing of the windings based on the detection of position.

Regarding the argument that the counter of Young stops at a preset value, and therefore there is no information to extract, the applicant is arguing that the limitations of his specification should be considered in examining his claim and this is improper.

The examiner's first action on the merits of the claims afforded the applicant the opportunity to amend the rejected claims to narrow their scope, by including information such as how the "selected time period" is selected and how it is delimited. This also afforded the applicant the opportunity to further delimit the means for determining the true position of the rotor via the information from the counter. However, the applicant has instead chosen to argue on the merits and the examiner is not persuaded.

The arguments regarding claim 1 are persuasive. The examiner has re-examined the rejection of the claim, in light of the applicant's argument. The examiner notes that his secondary reference to Lee is to a battery-powered communication device, while his primary reference to Young is to a motor control device. The examiner asserts that although the combined teaching of Young and Lee yield the method of claim 1, that there would be not be a proper motivation to combine and further that a person of ordinary skill in the art of motor control would not know to search for a solution in a communication art device. The examiner withdraws his rejection to claims 1, and to dependent claims 2, 4, 6 and 7.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The amended claim 13 and claims 22 and 23 are rejected under 35 U.S.C. 102(b) as being patented by Young (U.S. Patent 5,506,487).

As regards claim 13, Young teaches a method for detecting the angular position of a brushless electric motor, of the type in which the emission of a polarity signal of the back electromotive force by a detection circuitry associated with the motor is provided, comprising:

detecting a back electromotive force from a winding of the motor;

determining a polarity of the back electromotive force;

incrementing a counter up or down according to the polarity of the back electromotive force; and

repeating the determining and incrementing steps at a selected frequency during a selected time.

Young discloses (column 8, beginning line 45) "a method that includes the steps of sensing a back EMF voltage in the windings and generating a signal, BEMF, representative of the sensed back EMF voltage. The BEMF signal has first and second polarities representative of position of the rotatable assembly relative to a zero crossing of the sensed back EMF voltage. The first polarity is representative of the position of the rotatable assembly past a position corresponding to the zero crossing and the second polarity is opposite the first polarity. ... The commutation counter increases its count when the BEMF signal is of the first polarity and decreases its count when the BEMF signal is of the second polarity." Young discloses the details of the BEMF

counter (column 11, line 37): "Since the polarity of BEMF could actually be the result of electrical noise impressed on the back EMF voltage, (BEMF) counter 302 decreases its count when the signal polarity reverses, i.e., BEMF is low. Thus, the up/down BEMF count is repetitively counted partially up and then back down to zero before the true zero crossing. After the zero crossing, counter 302 accumulatively counts up to the preset value, even though occasional reverse counts are experienced along the way." Inherent in this method is the repeating of steps of determining and incrementing at the frequency of the counting rate and for the selected time of detecting the BEMF signal.

As regards claim 22, Young discloses a system, comprising:

a comparator module configured to detect a back electromotive force in a motor winding and supply a digital signal at an output based upon a polarity of the detected back electromotive force,

a counter module configured to increment up or down at a selected frequency according to a digital value at the output of the comparator module, and

an enable module configured to enable the counter module during a selected time period.

Young's reveals a comparator module (Figure 1, 158), and reveals a counter module (Figure 3B, 302) configured to increment up or down at a selected frequency according to a digital value at the output of the counter module. The counter is described (column 3, line 16): the commutation counter increases its count when the BEMF signal is of the first polarity and decreases its count when the BEMF signal is of the second polarity. He describes the means for enabling/disabling counting in column

12, line 48. Inherently the selected time period is the time that the BEMF signal is being detected.

As regards claim 23, as dependent on claim 22, Young discloses a position detection module to determine a true position of the rotor of the motor based up a count of the counter module at the end of the selected period of time. Young discloses the details of the BEMF counter (column 11, line 37): "Since the polarity of BEMF could actually be the result of electrical noise impressed on the back EMF voltage, (BEMF) counter 302 decreases its count when the signal polarity reverses, i.e., BEMF is low. Thus, the up/down BEMF count is repetitively counted partially up and then back down to zero before the true zero crossing. After the zero crossing, counter 302 accumulatively counts up to the preset value, even though occasional reverse counts are experienced along the way." Inherent in the function of determining the commutation signal in the determination of the "true" zero crossing.

Allowable Subject Matter

Claims 1-12 are allowed.

Claim 1 is allowed because the use of a bi-directional counter to count a difference in reference time in a motor control circuit, along with the other limitations of the claim, offer a novel solution for the detection of the angular position of a brushless electric motor. Dependent claims 2-12 are allowable as dependent on an allowed base claim.

Claims 15-20, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter in the objected claims: Although other references in prior art disclose some or all the broader limitations cited in the base claims, the additional limitations described in the allowed dependent claims were found to provide novel methods for the detecting angular position of a brushless motor, especially with respect to the method of using the up down counter. Claims 15-21, describe specific modifications to the method (found in base claims) of detecting rotor position, especially concerning the estimation of the zero crossing point and calculation methods, not found in prior art. The novel concept of claim 24 is the selecting of the time period of enabling the count such that the estimated point of zero crossing of the BEMF at the midpoint of the time period of the count sequence.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert W. Horn whose telephone number is 571-272-8591. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David S. Martin can be reached on 571-272-2107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

rwh
October 6, 2005

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